

WHAT IS CLAIMED IS:

1 An overvoltage protection circuit for a conductor, the circuit comprising:
a first switching means for connecting said conductor to a reference potential;
and a first trigger means operable to switch said switching means from a first, OFF
5 state to a second, ON state;

wherein said first trigger means is voltage-triggered by voltages exceeding a first
magnitude on said conductor and current-triggered by voltages exceeding a second
magnitude on said conductor, thereby to provide overvoltage protection at two discrete
voltage magnitudes.

10 2 A circuit as claimed in claim 1 wherein said first magnitude is greater than
said second magnitude.

3 A circuit as claimed in claim 2 wherein said first trigger means comprises a
current trigger element for current triggering said first switching means when said voltage
on said conductor exceeds said second magnitude.

15 4 A circuit as claimed in claim 2 wherein said first trigger means comprises a
voltage trigger element for voltage triggering said first switching means when said voltage
on said conductor exceeds said first magnitude.

5 A circuit as claimed in claim 3 wherein said current trigger element is
operable to generate a trigger signal in dependence on the current flowing through said
20 conductor, thereby to trigger conduction of said switching means in response to said current
exceeding a preselected value.

6 A circuit as claimed in claim 5 wherein said current trigger element comprises
a resistive element.

7 A circuit as claimed in claim 5 wherein said current trigger element comprises
25 first and second parallel resistive elements.

8 A circuit as claimed in claim 6 wherein said current trigger element is
connectable in series with said conductor.

9 A circuit as claimed in claim 3 wherein said first trigger means comprises a
voltage trigger element for voltage triggering said first switching means when said voltage
30 on said conductor exceeds said first magnitude.

10 A circuit as claimed in claim 9 wherein said current trigger element is

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operable to generate a trigger signal in dependence on the current flowing through said conductor, thereby to trigger conduction of said switching means in response to said current exceeding a preselected value.

11 An overvoltage protection circuit for a conductor, the circuit comprising:
5 a first SCR having a cathode terminal for connection to said conductor, an anode terminal for connection to a reference potential, and a gate;

and a first trigger operable to switch said first SCR from a first, OFF state to a second, ON state;

10 wherein said first trigger is voltage-triggered by voltages exceeding a first magnitude on said conductor and current-triggered by voltages exceeding a second magnitude on said conductor, thereby to provide overvoltage protection at two discrete voltage magnitudes.

12 A circuit as claimed in claim 11 wherein said first magnitude is greater than said second magnitude.

13 A circuit as claimed in claim 12 wherein said first trigger comprises a current
15 trigger element for current triggering said first switching means when said voltage on said conductor exceeds said second magnitude.

14 A circuit as claimed in claim 12 wherein said current trigger element is operable to generate a trigger signal in dependence on the current flowing through said conductor, thereby to trigger conduction of said switching means in response to said current
20 exceeding a preselected value.

15 A circuit as claimed in claim 13 wherein said current trigger element is connected between said gate and said cathode terminal.

16 A circuit as claimed in claim 14 wherein said current trigger element comprises a resistive element.

25 17 A circuit as claimed in claim 14 wherein said current trigger element comprises first and second parallel resistive elements.

18 A circuit as claimed in claim 16 wherein said current trigger element is connectable in series with said conductor.

19 A circuit as claimed in claim 11 wherein said first trigger comprises a voltage
30 trigger element for voltage triggering said first SCR when said voltage on said conductor exceeds said first magnitude.

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20 A circuit as claimed in claim 19 wherein:

said first SCR comprises a first npn transistor device and a second pnp transistor device;

5 each transistor device has its base electrically connected to the collector of the other device;

the emitter of each device is electrically connected to a respective one of the anode and cathode terminals;

the base of one of the devices is electrically connected to the gate of the SCR;

10 said voltage trigger element is a zener diode means which is electrically connected across the bases of said devices;

and said zener diode means has a preselected reverse breakdown voltage to trigger conduction of said first SCR in response to said voltage on said conductor exceeding said first magnitude.

15 21 A circuit as claimed in claim 19 wherein said voltage trigger element is a transistor device connected between said gate and said anode terminal and the base of the transistor device is connected to a preselected reference voltage at said first magnitude.

22 A circuit as claimed in claim 20 wherein said voltage trigger element is a third npn transistor device having its collector connected to the emitter of the second pnp transistor device, its emitter connected to said gate, and its base connected to a preselected reference voltage at said first magnitude.

20 23 A circuit as claimed in claim 11 further comprising a diode means connected in antiparallel between said anode and cathode terminals.

24 A circuit as claimed in claim 11 further comprising:

25 a second SCR connected in antiparallel to said first SCR;
and second trigger;

wherein:

said first trigger is voltage triggered by voltages exceeding said first magnitude of a first polarity and said second trigger is voltage triggered by voltages exceeding said first magnitude of the reverse polarity.

30 25 A circuit as claimed in claim 11 further comprising:

a complementary, second SCR connected in parallel with said first SCR so as to

provide a complementary pair of SCRs;

and second trigger operable to switch said first SCR from a first, OFF state to a second, ON state;

wherein:

5 said first trigger is voltage-triggered by voltages of a first polarity exceeding said first magnitude on said conductor and current-triggered by voltages of said first polarity exceeding said second magnitude on said conductor;

10 and said second trigger is voltage-triggered by voltages of the reverse polarity exceeding said first magnitude on said conductor and current-triggered by voltages of said reverse polarity exceeding said second magnitude on said conductor;

thereby to provide overvoltage protection at two discrete voltage magnitudes of both polarities.

26 A circuit as claimed in claim 12 wherein said first trigger comprises a current trigger element for current triggering said first switching means when said voltage on said
15 conductor exceeds said second magnitude.

27 A circuit as claimed in claim 26 wherein said current trigger element is operable to generate a trigger signal in dependence on the current flowing through said conductor, thereby to trigger conduction of said switching means in response to said current exceeding a preselected value.

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